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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,991	06/29/2001	In Jae Chung	41501-5431	5669

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EXAMINER

DI GRAZIO, JEANNE A

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 11/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,991

Applicant(s)

CHUNG ET AL.

Examiner

Jeanne A. Di Grazio

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION
LIQUID CRYSTAL DISPLAY DEVICE

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Korea on July 4, 2000. It is noted, however, that applicant has not filed a certified copy of the Korean Patent Application No. 2000-38015 as required by 35 U.S.C. 119(b).

Title of Invention Not Descriptive

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The Examiner suggests: *Liquid Crystal Display Device with Substantially Bilaterally Symmetric Pixel Electrodes*.

Drawings

Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 19 is objected to because of the following informality: "date lines" in the fourth line of claim 19 should be "data lines." Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song (USPN 6,091,464) in view of Kwak (USPN 6,384,878 B1).

Per claims 1-4: TFTs over the first substrate adjacent intersections of the scan and data lines; substantially bilaterally symmetric pixel electrodes in the pixel areas ... each of the pixel electrodes has a shape in which a lower right corner and a lower left corner are removed ... each of the pixel electrodes has a lower center projection extending downwardly ... each of the pixel electrodes is electrically connected to a TFT at the lower center projection.

Discussion: A liquid crystal layer interposed between two substrates is common in the art of liquid crystal technology. Song has a plurality of scan lines and data lines crossing each other and defined pixel areas [Col. 2, Lines 32-41]. Song also has TFTs adjacent intersections of scan and data lines [Id.]. Song does not appear to have substantially bilaterally symmetric pixel electrodes; however, Kwak does have substantially bilaterally symmetric pixels as shown in Kwak Figure 10 (highlighted in yellow for Applicant's convenience). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song in view of Kwak to avoid defects arising from electrostatic charges without limiting the storage capacitance, which is an inherent design parameter for a display device, inside the display area [Kwak, Col. 2, Lines 30-33]. Concerning the removal of a lower right and left corner of the pixel electrode, see Kwak, Figure 10.

Song has each pixel electrode comprising an expanded projection portion towards a metal segment [Col. 2, Lines 51-53]. Song has such a projection extending from the pixel electrode and in contact with a metal segment [Id.]. In Song, a TFT is electrically connected with the pixel electrode [Col. 2, Lines 40-41]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song such that the projection portion of the pixel electrode would electrically connect to the TFT for switching, connection ease, and satisfactory picture quality [Song, Col. 2, Line 17 referring to how to improve poor color quality].

Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song (USPN 6,091,464) in view of Kawano et al. (USPN 5,677,745) in further view of Park et al. (USPN 6,411,347B1) and Kwak (USPN 6,384,878 B1).

Per claims 5-9 (pixel areas): a pair of a first and second projection projecting from an adjacent scan line at one side, the first projection being separated from the second projection ... TFT formed adjacent an intersection of the adjacent scan line and an adjacent data line ... a storage capacitor connected to the pixel electrode, the storage capacitor including an electrode overlapping with the second projection of the scan line for an adjacent pixel area, wherein in each of the pixel areas, the pixel electrode has a projection connected to the TFT, the projection of the pixel electrode being disposed between the first projection and the second projection of the adjacent scan line, the pixel electrodes further having a portion overlapping with the scan line for the adjacent pixel area ... the first projection is a gate electrode of the TFT ... the pixel electrode has a shape avoiding the first projection and the second projection of the adjacent scan line ... the electrode for the storage capacitor has a shape projecting towards a lower right part of the pixel electrode in the adjacent pixel area ... each pixel electrode is substantially bilaterally symmetric.

Discussion: As noted previously, Song has scan and data lines crossing each other and pixel areas. Song does not appear to have projections on a scan line; however, Kawano et al. does have scanning lines with projections wherein a first projection and a second projection are separate from each other [See Kawano et al., Figure 11]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song in view of Kawano et al. to prevent short circuiting [Kawano et al., ABS.].

TFTs formed adjacent intersections of scan and data lines have been previously addressed.

Song does not appear to have a storage capacitor including an electrode overlapping with the second projection of a scan line; however, Park et al. (USPN 6,411,347 B1) does have a storage capacitor overlapped with a gate line. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song in view of Park et al. for improved image quality [Park et al., Col 2, Lines 42-43]. Kawano et al. has a pixel with a projection

connected to a TFT [Figure 11]. Kawano et al. has a projection of a pixel electrode disposed between the first and second projection of an adjacent scan line [Figure 10]. The pixel may have a portion overlapping a scan line in Kawano et al. Figure 10. In Kawano et al. the first projection appears to be connected to a TFT [Figure 10]. In Kawano et al., the pixel has a shape avoiding the first and second projection of the adjacent scan line [Figure 10]. In Kawano et al. the electrode for the storage capacitor appears to have a shape projecting towards a lower right part of a pixel electrode in an adjacent pixel area [Figure 10]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song in view of Kawano et al. to prevent short circuiting.

Song does not appear to have pixel electrodes substantially bilaterally symmetric; however, as previously noted, Kwak does have such a structure [Figure 10 of Kwak]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song and Kawano et al. in view of Kwak to avoid defects arising from electrostatic charges as noted previously.

Claims 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song (USPN 6,091,464) in view of Kwak (USPN 6,384,878 B1) in further view of Kawano et al. (USPN 5,677,745).

Per claims 10-20 (TFT substrate): a TFT in each pixel area, one terminal of the TFT being connected to one of the adjacent data lines, another terminal of the TFT being connected to one of the adjacent scan lines and a pixel electrode in each pixel area, connected to still another terminal of the TFT in the pixel area, the pixel electrode having a pattern configured to yield substantially the same capacitance value for capacitors that are formed between the pixel electrode and the adjacent data line on one side and between the pixel electrode and the adjacent data line on another side ... the pattern of the pixel electrode is symmetric about a virtual line extending substantially vertically and passing a center of the pixel area ... the pixel electrode has a substantially rectangular pattern in which a lower right corner and a lower left corner are removed by substantially the same amount ... each of the pixel areas includes a storage capacitor connected to the pixel electrode for the pixel area ... an area occupied by the storage capacitor

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for a pixel area extends into such a space in an adjacent pixel area ... each pixel area includes a projection projecting from the adjacent scan line that is connected to the TFT in the pixel area and wherein the storage capacitor for a pixel area is constructed at least in part by the projection of the scan line for an adjacent pixel area ... each pixel area has an electrode for the storage capacitor, the electrode for the storage capacitor for a pixel area overlapping with the scan line for an adjacent pixel area and the projection thereof ... the pixel electrode in each of the pixel areas has a portion overlapping with the scan line for an adjacent pixel area, and wherein the storage capacitor for the pixel area is constructed at least in part by the portion of the pixel electrode that overlaps with the scan line for the adjacent pixel area ... each pixel area has spaces between the pixel electrode and adjacent data lines, and the area of the space between the pixel electrode and one of the adjacent data lines is substantially the same as the area of the space between the pixel electrode and another one of the adjacent data lines ... each pixel area includes a storage capacitor connected to the pixel electrode for the pixel area, and an area occupied by the storage capacitor for a pixel area extends into an adjacent pixel area.

Discussion: Song has a TFT electrically connected with a pixel electrode, the scan line and the data line [Col. 2, Lines 40-41]. Concerning the pixel electrode pattern with the ability to yield substantially the same capacitance, Kwak has such a pixel pattern for the purpose of controlling electrostatic discharge and for controlling the ratio of storage capacitance to dummy storage capacitance [Figure 10 and Column 6, Lines 56-64]. It would thus have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song in view of Kwak to control capacitance.

The pixel pattern in Kwak is symmetric about a virtual line extending substantially vertically and passing a center of the pixel [Figure 10].

The pixel electrode shown in Figure 10 of Kwak has a lower right and lower left corner removed by about the same amount.

Concerning the storage capacitor: Kawano et al. has a storage capacitor connected to a pixel [Figure 10], an area occupied by the storage capacitor for a pixel area extending into an adjacent pixel area [Figure 10], each pixel area with a space between pixel electrode and one of adjacent data lines [Figure 10] and an area occupied by the storage capacitor for a pixel area extending into such a space in an adjacent pixel area [Figure 10]. It would have been obvious to

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one of ordinary skill in the art at the time the invention was made to modify Song in view of Kawano et al. to prevent short circuiting as previously noted.

Kawano et al. has a pixel area including a projection projecting from an adjacent scan line that is connected to a TFT in a pixel area [Figure 10] and a storage capacitor for a pixel area constructed at least in part by a projection of a scan line for an adjacent pixel area [Figure 10]. Concerning claims 17-20, please see Kawano et al., Figures 10 and 11.

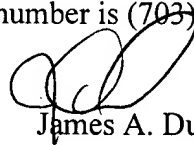
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Song in view of Kawano et al. as previously noted to prevent short-circuiting and ease of manufacture.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-8741 for regular communications and (703)746-8741 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio



James A. Dudek, Primary Examiner

JDG

November 17, 2002